IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
Yoshihiro AKAMATSU

Appln. No. 10/569,836
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Group Art Unit: 1796
Examiner: PENG, KUOLIANG

For: HEAT-RESISTANT LABEL APPLICABLE AT HIGH TEMPERATURE

Commissioner of Patents
PO Box 1450
Alexandria, VA 22313-1450
Sir:

DECLARATION UNDER 37 C.F.R.Section 1.132

I, Kenji Takehisa, do hereby declare that:

1. I am a Japanese citizen, residing at I-604, 3-1-15, Johnan-cho, Ikeda-shi, Osaka, Japan.

2. I graduated from Department of Chemistry, Faculty of Science and engineering, Kinki University, Osaka, Japan, in March 1987. I also graduated from the Graduate School of Kinki University, Osaka, Japan and received the degree of Master of Science, in March 1989.

3. I began my employment with YUSHI-SEIHIN CO., LTD., the assignee of the above-identified application in June 2005. Since June 2005, I have been engaged in the research and development of chemistry.

4. I am familiar with the subject matter of said application as well as the disclosures in the cited references.

5. The experiments given below were carried out under my general direction and supervision.

Experiment

Tests 1 and 2 were carried out using the following test labels.

Test Label

The following labels S1, S2 and R1 to R3 were produced. The labels used in Test 1 were printed with a bar code.

S1

S1 is a label with an aluminum foil support, as described in Example 42 of the present invention. S1 was used in Test 1.

S2

S2 is a label with an aluminum foil support, as described in Example 1 of the present invention. S2 was used in Test 2.

R1

R1 is a two-layer structure label without a support, which is equivalent to the label in Example 1 of JP2000-098899 (hereinafter, referred to as Reference 1). A label base layer of R1 was produced according to the disclosure in Example 1 of Reference 1, and hence is not a cured coating film. A sticking layer was produced according to the disclosure in Reference 1.

R2

R2 is a two-layer structure label without a support, which is equivalent to the label in Example 5 of Reference 1. A label base layer of R2 was produced according to the disclosure in Example 5 of Reference 1, and hence is not a cured coating film. A sticking layer was produced according to the disclosure in Reference 1.

R3

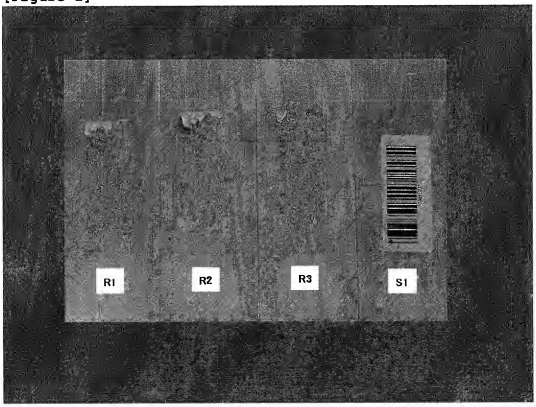
R3 is a two-layer structure label without a support, which is equivalent to the label in Comparative Example 2 of Reference 1. A label base layer of R3 was produced according to the disclosure in Comparative Example 2 of Reference 1, and hence is not a cured coating film. A sticking layer was produced

according to the disclosure in Reference 1.

Test 1 (Attachment at 300°C)
Attachment target: a 1.5 mm-thick aluminum plate
Attachment temperature: 300°C
Attachment means: a high-temperature attachment jig
Attachment period: 10 seconds
Attachment pressure: 150 g/cm^2

In an electric furnace maintained at 300°C, the test label was compressed to the surface of an aluminum plate with a surface temperature of 300°C, for 10 seconds using a high-temperature attachment jig. The aluminum plate was taken from the electric furnace after five minutes and allowed to cool to around room temperature. Then, the appearance of the label was observed and photographed. Please see the following Figure 1.

[Figure 1]



R1 to R3 attached to the attachment jig at 300°C, but barely attached to the aluminum plate. As a result, their bar codes could not be read. This presumably results from the fact that the label base layers of R1 to R3 have a sticking ability at an attachment temperature of 300°C.

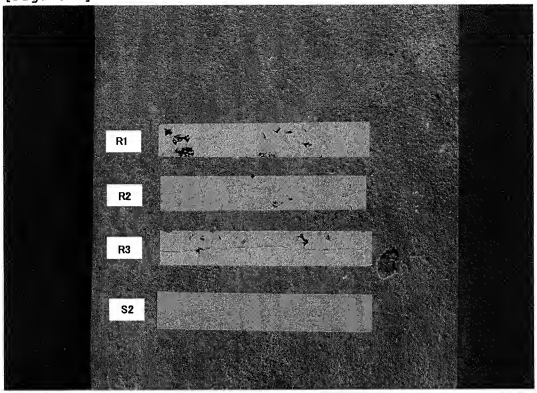
On the other hand, S1 did not attach to the attachment jig, even at a high temperature. The label base layer was in good condition, free of peeling or cracking, after being attached. The bar code could be read.

Test 2 (Attachment at room temperature and maintenance at 600°C for 4 hours)

Attachment target: a 26 mm-thick aluminum block (which has a rough surface and is more vulnerable to peeling and cracking than the aluminum plate)
Attachment temperature: room temperature
Maintenance temperature: 600°C
Attachment means: a high-temperature attachment jig
Attachment period: 10 seconds
Attachment pressure: 150 g/cm^2

The test label was compressed to the surface of an aluminum block for 10 seconds at room temperature using a high-temperature attachment jig. The aluminum block with the attached label was placed in an electric furnace maintained at 600°C. The block was taken out after four hours and allowed to cool to around room temperature. Then, the appearance of the label was observed and photographed. Please see the following Figure 2.

[Figure 2]



The four-hour, 600°C high-temperature condition of this test is far more severe than the one-hour, 600°C high-temperature condition of the heat-resistance test of Reference 1. Moreover, the condition of the attachment target is more severe for the label: this test employs an aluminum block having a rough surface, whereas the heat-resistance test of Reference 1 employs a glass slide that presumably has a less irregular surface. When a metal product is used as an attachment target, the metal curing process is not carried out in as short a time as one hour, but is generally continued for at least about four hours. This suggests that the label of the present invention is also usable in the curing process of metal products.

The label base layers of R1 to R3 were peeled off (black portions) and cracked (stripe-shaped portions). On the other hand, the label base layer of S2 was in good condition, free of peeling or cracking, even after maintenance at a temperature as high as 600°C for 4 hours.

Discussion

The test results are summarized in Table 1.

	R1	R2	R3	S1	S2
	Example 1 of Reference 1	Example 5 of Reference 1	Comparative Example 2 of Reference 1	Example 1 of Present Invention	Example 42 of Present Invention
Condition of Label Base Layer	Uncured	Uncured	Uncured	Cured	Cured
Support	Nil	Nil	Nil	Al Foil	Al Foil
Test 1: Attachment at 300°C	Attached to jig and mostly peeled off	Attached to jig and mostly peeled off	Attached to jig and mostly peeled off	No peeling or cracking	—
Test 2: Attachment at Room Temperature and Maintenance at 600°C for 4 Hrs.	Heavy peeling and lots of cracking	Light peeling and lots of cracking	Heavy peeling and lots of cracking	—	No peeling or cracking

Test 1 (attachment at 300°C) indicates that R1 to R3 of which the label base layers were uncured, demonstrated a sticking ability at the time of high-temperature label attachment. In contrast, S1 was easily attached by a high-temperature attachment jig. The reason for this is presumably because S1 did not substantially exert a sticking ability even under high-temperature conditions due to its cured label base layer.

Test 2 (attachment at room temperature and maintenance at 600°C) revealed remarkable peeling and cracking generated in the label base layers of R1 to R3. According to Reference 1, in the one-hour, 600°C heat-resistance test, the appearances of the label of Example 1 equivalent to R1 and the label of Example 5 equivalent to R2 were evaluated as "O (no defect in appearance)". However, in this test, under more severe temperature and attachment target surface conditions, R1-R3 did not exhibit sufficient abilities as heat-resistant labels.

On the other hand, no peeling and cracking was recognized in

the label base layer of S2 in the four-hour, 600°C process using the aluminum block with a rough surface. This is attributable to the following: the label had a support; the weight ratio of reactive silicone resin (A) to polymetallocarbosilane resin (B-1) in the composition for a label base layer was about 1:9 to about 9:1; and the label base layer was cured. Therefore, the label base layer was presumably prevented from being peeled off or cracked.

Although S1 and S2 do not correspond to heat-resistant label 2 of the present invention, heat-resistant label 2 has a support and the same label base layer as heat-resistant label 1. It is accordingly assumed that the same results of S1 and S2 will be obtained for heat-resistant label 2. This is also supported by the fact that in Test Example 2 of the present invention, the appearance evaluation of heat-resistant label 2 at 680°C, 700°C, and 1000°C was A (no significant change in the label).

6. I, the undersigned, declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: December 22, 2008

By 武久健治

Kenji Takehisa